



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 09/998,912 | 12/03/2001 | Akira Hamada | 011632 | 4274 |
| 23850 | 7590 | 05/19/2004 | EXAMINER | |
| ARMSTRONG, KRATZ, QUINTOS, HANSON & BROOKS, LLP 1725 K STREET, NW SUITE 1000 WASHINGTON, DC 20006 | | | MERCADO, JULIAN A | |
| | | ART UNIT | PAPER NUMBER | |
| | | 1745 | | |
| DATE MAILED: 05/19/2004 | | | | |

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 09/998,912 | HAMADA ET AL. | |
| | Examiner | Art Unit | |
| | Julian Mercado | 1745 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 22 March 2004.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) 7 is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-6 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

Claim 7 is withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in Applicant's response filed March 22, 2004.

Claim Objections

Claims 3 and 6 are objected to because of the following informalities:

In claim 3 at line 3 and claim 6 at lines 2 and 3 (both instances), it is suggested to insert -- first-- before "gas diffusion layer" in order to more clearly differentiate the [first] gas diffusion layer from the second gas diffusion layer.

Appropriate correction is required.

Specification

The examiner notes that the specification is replete with grammatical and idiomatic errors. Examples of such are: "...while the second gas diffusion layer 23 allows to from a more uniform catalyst layer 2. Besides, since the second gas diffusion layer 23 presenting a void rate smaller than that of the gas diffusion layer 4 is disposed by stack, the second gas diffusion layer 23 can play a role to control satisfactory the supply/discharge of reaction produced water and moving water." (specification on page 9)

Appropriate revision is advised.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 4 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 4 recites the limitation "the fiber forming said mesh sheet" in line 2. There is insufficient antecedent basis for this limitation in the claim. Additionally, it is suggested to change "the fiber" to --fibers--.

Claim Rejections - 35 USC § 102 and 103

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 1 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over by Hino et al. (U.S. Pat. 3,793,085)

Hino et al. teaches a gas diffusion layer for a fuel cell having a mesh sheet [303] with electrically conductive carbon powder and a water repellent filler such as paraffin and polystyrene. (col. 4 line 24-30) The carbon powder and water repellent material is represented by reference numeral [202] which envelops the mesh sheet [203] as follows from column 4 line 54-65.

Then a mixture consisting of 80 parts by weight of activated carbon powder and 20 parts by weight of a fluorinated ethylene-propylene fluorocarbon resin in powdery form (a copolymer of tetrafluoroethylene and hexafluoropropylene sold under the trade name of "Neoflon" by Daikin Kogyo Co., Ltd.) with a 20-mesh nickel net embedded therein was placed on the polyflon paper, and while gradually compressing, a pressure of 200 kilograms per square centimeter was applied thereto for 5 minutes to mold the mixture with the polyflon paper under compression.

As to a heat resistance and acid resistance for the mesh sheet it is asserted that these are inherent properties, absent of a showing by applicant that the claimed invention distinguishes over the reference. *In re Best*, 195 USPQ at 433, footnote 4 (CCPA 1977) and *In re Spada*, 15 USPQ 2d 1655 (Fed. Cir. 1990)

Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hino et al. as applied to claim 1 above, in view of Muranaka et al. (U.S. Pat. 5,500,292)

The teachings of Hino et al. are discussed above. In addition, Hino et al. teaches a second gas diffusion layer [305] stacked on the first gas diffusion layer [301]. (Figure 5 line 5-13) The first and second gas diffusion layers are both made of the Neoflon polyflon paper, thus the second gas diffusion layer is formed of the mixture of electrically conductive carbon powder and water repellent filler.

Hino et al. does not explicitly teach a void rate smaller in the second gas diffusion layer than that in the first gas diffusion layer. The examiner notes while the limitation "void rate" is neither defined by the claim nor the specification, a fair reading of applicant's specification leads

Art Unit: 1745

to the interpretation of this feature being correlative with the degree of water in the second gas diffusion layer; a smaller void rate (as claimed) translates to less water in the second gas diffusion layer. (refer to specification on page 16) As an additional note and consistent with this interpretation, dependent claim 3 appears to give breadth and scope to this property of a smaller “void rate” as being inversely proportional to the amount of water repellent filler. However, Muranaka et al. teaches a three-layered electrode [56] on which the outer gas diffusion layer [52] is desired to have a lower wettability compared to the layer adjacent the current collector [55]. (col. 5 line 16-44) The skilled artisan would find obvious to employ a higher amount of water repellent filler in the outer gas diffusion electrode of Hino et al. consistent with the desired property of lower wettability in this layer. The motivation for such a modification would be to remove water at high efficiency and prevent flooding at the outer gas diffusion layer/electrolyte interface. (see Muranaka et al. at col. 6 line 1-29)

As to dependent claim 4 reciting that the mesh sheet is coated beforehand with water repellent material, this limitation has not been given patentable weight as it is considered drawn to a temporal method-of-making feature. Notwithstanding, as discussed above the mesh sheet is “embedded” within a carbon powder and water repellent material. (*ib*)

Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hino et al. as applied to claim 1 above, in view of Benczur-urmossy. (U.S. Pat. 4,301,218)

The teachings of Hino et al. are discussed above.

As to dependent claims 5 and 6, Benczur-urmossy is cited to teach a second gas diffusion layer [1] having a thickness smaller than a first gas diffusion layer [3], in which the surface area

of the first gas diffusion layer is smaller than that of the second gas diffusion layer. (Fig. 1, col. 3 1-17) The skilled artisan would find obvious to modify Hino et al.'s invention in accordance with Benczur-urmossy's teachings for reasons such as reducing flow resistance in the gas transport layers. (see Benczur-urmossy at col. 3 line 18 et seq.)

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Julian Mercado whose telephone number is (571) 272-1289. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan, can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



Julian Mercado



Patrick Ryan
Supervisory Patent Examiner
Technology Center 1700